HIGH PERFORMANCE COMPUTING
MODERNIZATION PROGRAM OFFICE

OFFICE OF THE DIRECTOR OF
DEFENSE RESEARCH AND ENGINEERING
1010 NORTH GLEBE ROAD, SUITE 510
ARLINGTON, VA 22201

April 17, 2003

MEMORANDUM FOR: SEE DISTRIBUTION

SUBJECT: Call for FY 2004 Common High Performance Computing Software Support Initiative (CHSSI) Portfolio Project Proposals

The Department of Defense (DoD) High Performance Computing Modernization Program (HPCMP) seeks new CHSSI projects in FY 2004 to develop scalable high-performance software for DoD applications in three areas. Project proposals must integrate into one of the portfolio structures described below. Proposers should coordinate with the appropriate portfolio leader prior to submitting proposals and, if selected for funding, will be expected to collaborate with other projects within the portfolio. The selected projects are expected to cover a range of computational technology areas forming multi-disciplinary portfolios. Please solicit proposals from organizations within your purview for the following portfolio focus areas.

1. Collaborative Simulation and Testing (CST)
2. Modeling Multi-Phase Flow – Target Coupling (MFT)
3. Virtual Electromagnetic Design (VED)

Details concerning the scope of each portfolio are at Attachment 1.

All government scientists and engineers in DoD science and technology and test and evaluation laboratories, centers, facilities, and agencies may prepare CHSSI project proposals. The proposal's project leader must be a government DoD employee although parts of the proposed project may be contracted to industry, academia, or other government laboratories as appropriate. Annual funding for CHSSI projects ranges from $200,000 to $600,000 per year and projects typically last three years.

The attached package details the submission, evaluation, and selection processes, as well as proposal instructions. A copy of this memorandum with attachment is available on the HPCMP's WWW page at www.hpcmo.hpc.mil. Please note that the due date for proposals to the HPCMP is **1400 EDT July 2, 2003**.

Proposal project leaders should contact the portfolio leaders listed at Attachment 1 to this memorandum, not this office, for additional technical and funding information. My point of contact for this process is Dr. Leslie S. Perkins, Project Manager for Software Applications Support. She may be reached at 703-812-8205 or by email at chssi-team@hpcmo.hpc.mil.

/Signed/
Cray J. Henry
Director
High Performance Computing
Modernization Program

Attachments:
1. *FY 2004 CHSSI Portfolios*
2. *FY 2004 CHSSI Portfolio Project Selection Plan*

cc:
High Performance Computing Advisory Panel Members
Computational Technology Area Advisory Panel Members
Portfolio Leaders

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Director, U.S. Army Corps of Engineers, Engineer Research and Development Center, Information Technology Laboratory
Chief, Programs Office, US Army Corps of Engineers, Engineer Research and Development Center
Commander, Naval Surface Warfare Center
Commander, Naval Surface Warfare Center, Dahlgren Division
Commander, Naval Surface Warfare Center, Indian Head Division
Commander, Naval Surface Warfare Center, Panama City Division

Commander, Naval Air Warfare Center, Weapons Division
Commander, Naval Air Warfare Center, Aircraft Division
Commander, Space and Naval Warfare Systems Command
Commanding Officer, Space and Naval Warfare Systems Center, San Diego
Commander, Naval Undersea Warfare Center
Commander, Arnold Engineering Development Center
Commander, Air Force Air Armament Center
Commander, Air Force Flight Test Center
Commander, Electronic Systems Center
Commander, Space and Missile Systems Center
Commander, Air Force Weather Agency Center
Commander, Air Force Aeronautical Systems Center
Corporate Information Officer, Air Force Research Laboratory
Director, Air Force Research Laboratory/Air Force Office of Scientific Research
Director, Air Force Research Laboratory/Directed Energy Directorate
Director, Air Force Research Laboratory/Human Effectiveness Directorate
Director, Air Force Research Laboratory/Information Directorate
Director, Air Force Research Laboratory/Materials and Manufacturing Directorate
Director, Air Force Research Laboratory/Munitions Directorate
Director, Air Force Research Laboratory/Propulsion Directorate
Director, Air Force Research Laboratory/Sensors Directorate
Director, Air Force Research Laboratory/Air Vehicles Directorate
Director, Air Force Research Laboratory/Space Vehicles Directorate
Commandant, Air Force Institute of Technology
Superintendent, U.S. Military Academy at West Point
Commander, U.S. Naval Academy
Commander, Naval Postgraduate School
Commander, Air Force Academy
Commander, Defense Information Systems Agency - Joint Interoperability Test Command

FY 2004 CHSSI Portfolios

1. Collaborative Simulation and Testing (CST)

Portfolio Leader: Dr. David B. Findlay, FindlayDB@navair.navy.mil

This is a new portfolio to provide scalable software for military applications focused on collaborative simulation and testing to reduce risk in weapon system development and to provide information to senior decision makers throughout the life cycle of the systems. The products of the CST portfolio will allow for simulations and resultant data prior to a test, capture test results, perform real-time data validation of test results, and provide for data interrogation and comparisons after the test. This portfolio will focus on the fundamental elements that are common to all vehicle test and evaluation (T&E) efforts (e.g., performance, stability and control, propulsion/power, payload/weapon integration, etc.) and their integration. While this portfolio is applicable to all vehicle types, the current call will focus on simulation for T&E of air vehicles. The emphasis is on joint (multi-service) efforts with a requirement that projects will be interoperable with each other and with test processes and test assets, providing a fully integrated, comprehensive tool. The integration of coupled multi-physics (e.g., aerodynamics, structures, propulsion, flight controls, etc.) simulations with each other and with test assets will be accomplished via a software framework, provisions for which must be included in every proposal. The data and information produced by any one topic area will be useable by projects in other topic areas as input transferred through the portfolio framework.

The complex systems-of-systems in development today require closer integration between modeling and simulation (M&S) utilizing high performance computing (HPC) and T&E, including the phases of test planning, actual test, and post test analysis. In the test planning phase, HPC resources can be a powerful tool for shaping and refining the test matrix enabling more efficient and effective ground and flight test. During vehicle T&E, both real time and time critical HPC resources are the key to data validation and test direction. In the post-test phase, HPC resources are critical for data analysis, archival, and collaboration between test centers and their customers. Finally, M&S are critical for virtual T&E of systems as they are being developed to predict vehicle flight characteristics under severe conditions, guide development and placement of embedded instrumentation, and assess hardware-in-the-loop and software-in-the-loop as they become available to name a few.

The portfolio will be tested as independent projects and globally, pulling together all related projects for the three software test events. Proposers are encouraged to consider how their projects will be tested, how their projects will relate to the other portfolio topic areas, and how their simulations will be incorporated into physical testing. Project integration will be made possible through the framework project. Porting to parallel platforms and optimizing performance will be the primary activities of successful proposals. **Project proposals are requested in seven CST topic areas shown on pages following (pp. 1-2 and 1-3). Each proposal submitted for the CST portfolio must be directed to a <u>single</u> topic area. Proposals which seek to address more than one CST topic area will not be accepted for further evaluation.**

Portfolio Integration Framework (PIF)
Proposals are sought that will provide an overall software framework with the ability to integrate all the projects within this portfolio. A framework is desired which utilizes proven systems engineering methods to integrate the use of HPC resources across the spectrum of the T&E processes addressed. The framework will manage the actual execution and interaction of the many models, interact with test data sources (models and instrumentation), provide the ability to interrogate the data files, provide access (via an archive or links to archives) to historical work, and allow the user to directly compare historical, design, simulation, and test data and archive all desired results. The system should allow for the general focus of CST portfolio topic areas represented by the individual projects as well as other relevant topic areas which are of interest during the development and test of a vehicle. The framework will allow for projects to be implemented in a modular form and employed either independently or dependently.

Vehicle Performance, Stability and Control (VP)
Proposals are sought that will parallelize multi-disciplinary computational tools for use on HPC platforms that can be applied routinely to aircraft flying qualities and performance evaluation during development and flight tests. Strong coupling with flight control system simulation is recommended. Emphasis should be on tools that predict and analyze the challenging flow conditions, performance issues, and control effectiveness such that T&E recommendations can be made based on diagnostic capabilities of the codes. In addition, current air vehicle T&E programs seek to update flight simulation models based on test data throughout the flight test effort. Projects proposed in this area should be directed toward HPC tools that will allow rapid simulation parameter updates. All computational and test methods will be managed by a software framework, through an interface which will be included in the proposal.

Propulsion and Power Integration (PPI)
Proposals are desired that will address T&E of airframe-propulsion integration, and in particular inlet-engine and engine-transmission compatibility. Of primary interest is valid and efficient simulation to be used in coupling of component tests conducted in wind tunnels, mechanical integration load rigs, and engine altitude facilities. The concentration should be the parallelization and integration of existing modeling and simulation (M&S) techniques that improved a wide spectrum of T&E for these systems. The simulations and data produced by this topic area will be useable by other CST portfolio topic areas such as Vehicle Performance, Stability and Control as input transferred through the portfolio framework. This type of project integration will be made possible through the framework project.

Aero/Structural Interactions (ASI)
Proposals are requested that will support and enhance testing of flexible structures and air vehicles with and without external stores and sensors. Emphasis should be on coupling existing computational methods for vehicle aerodynamics, flight mechanics, structures, and

acoustics. It is desirable for the methods to capture the subtleties of altering the mass properties of a flexible structure, such as when adding or removing stores or electronic pods. The methods should be able to predict the aeroelastic performance, sensor alignment, store/airframe interactions, etc. and lead to corrective solutions. The simulations could then be used in the testing process to define a driver for a shaker table to achieve a desired vibration signature, guide development of software for controlling sensor pointing and reconciliation of measurements, establish control surface schedules over the flight envelope, etc. All computational and test methods will be managed by a software framework, through an interface which will be included in the proposal.

Dynamic Interface (DI)
We seek proposals that provide an M&S capability to replicate and interrogate the dynamic interface between an air vehicle and severe atmospheric and operating condition environmental effects associated with natural occurrences (e.g., mountainous wind shear, sand storms, icing, or high altitude) and manmade occurrences (e.g., shipboard turbulence, urban turbulence, or hot gas re-ingestion). Of particular interest are software parallelization projects that can be used to construct and perform virtual T&E of air vehicles and to assess the effect of severe environments on the flight dynamics and performance. The impetus of the topic area will be to establish HPC simulations that will allow for enhancements and greater efficiency of flight test methods and to improve flight test safety. The simulations and data produced by this topic area will be useable by other CST portfolio topic areas such as Vehicle performance, stability and control and air delivery systems as input transferred through the portfolio framework. All computational and test methods will be managed by a software framework, through an interface which will be included in the proposal.

Air Delivery Systems (ADS)
Precision air delivery is important to all services, computationally very complex to model, and difficult in testing to achieve repeatability. The difficulties arise from the close coupling of in-flight condition, aircraft flow field, payload, and drag device (parachute, parafoil, etc.), as well as the dynamic coupling of the deformable structure of the drag device with the surrounding air and the payload. Proposals are sought to integrate collaborative simulation models for terrain, weather, aircraft, payload, and the drag device with drop test instrumentation, (weather instruments, global positioning system, velocity, accelerometers, etc.) to yield a complete airdrop process. All computational and test methods will be managed by a software framework, through an interface which will be included in the proposal.

Vehicle Survivability (VS)
Proposals are sought that model, simulate, and analyze all aspects of air vehicle flight survivability, especially aircraft signature, decoy techniques, and systems failure modes. Emphasis should be on combining existing techniques and tools with the T&E of these types of survivability issues. All computational and test methods will be managed by a software framework, through an interface which will be included in the proposal.

2. Modeling Multi-Phase Flow – Target Coupling (MFT)

Portfolio Leader: Mr. Bob Garrett, GarrettRK@nswc.navy.mil

Modeling and simulation toolsets in the munitions community that are used to gauge weapon system effectiveness and develop/assess new weapons and concepts of operations (CONOPS) are based on our cold war legacy. As a result they heavily rely on empirical data sets, cold war era CONOPS and system requirements. This historical basis presents the weapon system S&T development community with a perplexing problem. How can the effectiveness of a new weapon system concept be accurately assessed when the current assessment tools cannot "deal" with new lethal mechanisms, new delivery systems, battle damage assessment techniques, and/or a dramatically different CONOP? In addition we must field these new systems in only a few years, not the traditional 10 to 15 year development cycle. To achieve the DoD vision of fielding transformational weapons in the near term we need to quickly move beyond cold war paradigms. Providing physics-based modeling and simulation tools to the weapon design and effectiveness assessment communities is critical if we are to deliver transformational weapons to the war fighter in a timely manner.

The purpose of this portfolio is to integrate scalable, parallel, physics-based, and continuum codes in a coupled framework to address the interaction of lethal, multi-phase flow energy flux from metal (or reactive material) enhanced-blast explosively-loaded ordnance with light surface targets. These surface targets are to include reinforced concrete structure typical of a MOUT (military operations in urban terrain) scenario; communication towers, satellite dishes; missile launchers and light armor vehicles; inbound threat missiles/kinetic energy rods engaged by active protection systems; and asymmetric threats such as small boats. The toolset needs a common set of physics capable of predicting target loading function and the subsequent response, especially the details of target failure. Currently, these capabilities are not available in a parallel, integrated and coupled framework. In addition, key physics and chemistry associated with the explosive generation of the multiphase wave (metal and reaction products) and its propagation need to be represented with fidelity. The codes must have compatibility with the Department of Energy Sandia National Laboratory "SIERRA" coupling methodology (reference http://www.sandia.gov/ASCI/apps/SIERRA.html). Integration of these project-generated codes into the SIERRA framework will be conducted by an over arching team of Sandia and DoD laboratory experts. The integration team will also evaluate code performance under the Army Research Laboratory ICE (Interdisciplinary Computing Environment developed under HPCMP funding). This can be accomplished due to the common database formats of ICE and SIERRA. **Project proposals are requested in three MFT topic areas shown on page 1-5. Each proposal submitted for the MFT portfolio must be directed to a <u>single</u> topic area. Proposals which seek to address more than one MFT topic area will not be accepted for further evaluation.**

Multi-phase Flow (MPF)
Proposals are sought for an existing parallel code that provides a modeling and simulation capability of the physics of multi-phase flow resulting from the detonation of metal filled enhanced blast explosives. The primary thrust in this topic area is to physically represent the non-reacting, multi-phase, blast wave in a scalable, explicit continuum code. The capability to independently represent both the fluid and particulate components in a manner that can be coupled to, and mechanically load a structure is essential. This includes modeling the turbulent nature of the flow that occurs after fireball formation, turbulent mixing of the gas/particulate phases, and any particulate interaction with the turbulence structures. The code must be compatible with the SIERRA coupling methodology.

Reaction Chemistry (RC)
Projects are encouraged for an existing parallel code capable of modeling the explosion/ combustion reaction chemistry to deal with the issues surrounding reacting multi-phase flow from metallized blast explosives (using aluminum, higher density metal fuels, and/or thermites, etc). Turbulent mixing, combustion, and reaction chemistry (both during the detonation and fireball formation) must be included in the parallel code. The code must be compatible with the SIERRA coupling methodology.

Structural Response/Failure (SRF)
Proposals are sought for an existing parallel, explicit, Lagrange code with a library of continuum and structural elements, robust parallel contact algorithms capable of dealing with explosively driven deformations, and adaptive techniques to capture the physics of localization and subsequent failure. Of interest is the ability to capture the phenomena of "behind armor" debris "clouds", both spatially and temporally, as a result of structural failure. Element free, Lagrangian methods have demonstrated capability to address this need. The code must be compatible with the SIERRA coupling methodology.

3. Virtual Electromagnetic Design (VED)

Portfolio Leader: Dr. Kueichien Hill, Kueichien.Hill@wpafb.af.mil

This new portfolio will provide the DoD the ability to design from first-principle electromagnetics *in-situ* wide-band, multi-functional antennas and rough surface scattering solutions for a wide range of DoD activities including communication, acquisition, target identification, surveillance, and electronic attack. This portfolio will leverage the substantial earlier investments in HPC electromagnetics for wave scattering from complex targets. The call for proposals includes the following topic areas: large antenna array simulation, antenna-platform interaction, antenna design optimization, frequency/time domain interface, rough surface scattering/radiation, and graphical user interface which integrates the tools developed under other topic areas to produce a tightly coupled antenna design and rough surface simulation tool. The integrated tool shall address the tri-service requirements of providing accurate antenna design and rough surface scattering for air, ground, and sea vehicles, specifically those envisioned by the Ultra-Wideband Array program, Future Combat Systems, and Integrated Topside Design program. **For a more detailed description of topic areas within VED, contact the portfolio leader. For the VED portfolio, a single proposal may address one, a few, or all of the portfolio's topic areas. Proposals that address only a subset of the capabilities solicited for VED must include ideas and plans for integration and communication with tools developed under other topics in a manner that preserves the relevant physics for solving relevant problems of extremely large electrical size.**

FY 2004 CHSSI Portfolio Project Selection Plan

1. Proposal Due Date and Time: Proposal submissions must be sent electronically as email attachments to the Project Manager for Software Applications Support at chssi-team@hpcmo.hpc.mil so as to arrive no later than 1400 EDT July 2, 2003. The subject line of the email should read "FY 2004 CHSSI Project Proposal."

2. Proposal Medium: The proposal must be submitted as an electronic document attachment, either as an MS Word 97 (or later) file or as an Adobe Acrobat Portable Document Format (*.pdf) file. Security settings must allow for printing and for text and image copying. Embed images only if necessary to convey the scheme of the development effort. Unnecessary high-density images detract from the content of the proposal and significantly increase file size.

3. Proposal Format: Proposals not in the proper format will not be reviewed. The proposal will consist of a title page, the proposal text, and attached resumes. All pages must use 1 inch margins, single-spaced lines, and 12-point Times New Roman font. The title page must contain the information in the sequence described at 3a, below. Proposal text is limited to twenty (20) pages and must adhere **strictly** to the proposal format (sequence and content) detailed at 3b. The attached resumes (see "Project Team Members," below) may not exceed five (5) pages.

a. Title Page: The title page may contain no proposal text. The title page (one page) is limited to the five subheadings described below.

Title Page Mandatory Headers	Content Description
Project Title	Short descriptive title; 2 lines maximum
DoD Project Leader	Name, organization, position, mailing address, commercial voice phone number, fax number, email address of the government project leader. Only proposals from **DoD sponsors** with **DoD project leaders** will be accepted.
Project Team Members	Name, organization, and role of each project team member. Note that a resume for each member must be attached to the proposal.
Portfolio and Topic Area(s) To Which Proposal Applies	List only one (1) portfolio as described in the *Call for FY 2004 Common High Performance Computing Software Support Initiative (CHSSI) Portfolio Project Proposals* for which the proposal is submitted. List the portfolio topic area(s) addressed by this proposal. *Remember, for CST and MFT portfolios, the proposal must address only a single topic area described in the call. For the VED portfolio, a single proposal may address one, a few, or all of the portfolio's topic areas.*

Title Page Mandatory Headers	Content Description
Abbreviated Funding Table	List the requested funding for code development and for project management per year. (Include funding for required documentation, testing, and reporting under "Project Management".)

Funding Category	FY 2004	FY 2005	FY 2006	Total
Code Development				
Project Management				
Total CHSSI Funding	=sum(b2:b3)	=sum(c2:c3)	=sum(d2:d3)	=sum(e2:e3)

b. Proposal Text: This section is limited to **twenty** (20) pages (total) exclusive of resume attachment. Mandatory contents and sequence are shown below:

Proposal Text Mandatory Headers	Content Description
Executive Summary	The executive summary **may not exceed** one page. The summary must include the five subheadings, below.
Title	Title of the project
Technical Goals	State the broad technical goals of the project.
Technical and Computational Challenges	Describe technical and computational challenges expected in the software parallelization.
DoD Impact	Specify DoD impact of the project's goals.
Abstract	Provide a high level abstract of the proposal.
Goals and Objectives	Concisely describe the goals and objectives of the proposed project.

Proposal Text Mandatory Headers	Content Description
Portfolio Match	This section addresses the first evaluation criterion: "Fit of the Proposed Project within the Portfolio Topic." In this section explain how the project fits the structure of the portfolio as described in the call for proposals and how the project addresses a specific need stated in the call. Explain the value of the software proposal to the portfolio. This is an important requirement. Proposals that do not fit the portfolios for which projects are solicited will be **disqualified**. Remember that, for VED proposals... "Proposals that address only a subset of the capabilities solicited for VED must include ideas and plans for integration and communication with tools developed under other topics in a manner that preserves the relevant physics for solving relevant problems of extremely large electrical size."
Technical Merit	This section is composed of five subsections that, in aggregate, address the second evaluation criterion: "Technical Merit of the Proposed Project." Proposed projects must focus on developing scalable portable software that builds upon existing critical DoD application software or relevant infrastructure software. In the **subsections** (Background and Value, Applicability, and Restrictions, etc.) which follow, provide the necessary information for the evaluation teams to appraise your proposal's merit against the following questions: - Will the proposal result in significant technical advancement? - What is the value of the software proposal to the applicable portfolio? - Are the technical approach and level of innovation appropriate?
Background and Value	Present a concise **background** of the subject area and legacy software addressed by the proposal. Then explain why scalable versions of this capability are **needed and/or valuable** to critical DoD problems and how the proposed project **enhances** the DoD capability to model/analyze such critical problems. Compare this proposed effort to the **state-of-the-art/ state-of-the-practice**.

Proposal Text Mandatory Headers	Content Description
Applicability and Restrictions	Describe the community of scientists and engineers who would be expected to **use** the resulting parallel software. Describe your initial plans to accomplish **technology transfer**. Describe any factors that may **limit** use of the product. In this section also, discuss the **intellectual property rights**, security **classification/export control issues, and software protection eligibility** associated with the development of the proposed software. Typically, CHSSI software binary and source code is widely disseminated in the DoD. If this is not planned for this project, please explain. Ensure you satisfactorily answer the question: Will the resulting code be useful to a wide technical community?
Technical Approach and Leveraging	Discuss any links to, **leveraging** of, or collaboration with other scalable software projects sponsored by other DoD or government agencies, industry, or academic institutions. Then discuss the **technical approach and method(s)** to be used in parallelizing the proposed software project and the scalability to be attained. Explain how these will differ from or complement the linked/leveraged projects. Describe the proposed plan to achieve software **scalability, portability, and reusability** for DoD high performance computing platforms. Discuss plans to ensure **compatible** performance with existing and planned scalable application software. Explain the **risks** associated with the proposed approaches as well as steps to mitigate them. Discuss the results of a **performance profiling** scan of the current software. The results should highlight what software profiling application was used, and the platform(s) used for the profiles, and should identify the areas of the application with associated performance data. If the existing code has been parallelized, provide a table detailing the performance of the code as a function of the number of processors on ported architectures. Please provide sufficient background information

Proposal Text Mandatory Headers	Content Description

regarding the test case used for these performance numbers and the units of the performance measure.

Number of Processors	Architecture 1	Architecture 2

Ensure this section satisfactorily answers the questions:

- Are the technical approach and level of innovation appropriate?
- Will the proposal result in significant technical advancement?
- Where is/are the bottleneck(s) in the application?
- Will parallelization remove or lessen the(se) bottleneck(s)?
- Is the potential speed-up in performance commensurate with requested funds?

Metrics — Describe the **history** of the algorithms to be used and, briefly, describe the **verification and calibration** that the application software has undergone. Enumerate and explain the benchmarks and known numerical and/or experimental data for validating and evaluating the proposed scalable application software, and how these will be adapted and employed for this project.

Deliverables — List the **specific software products** that will be completed at the conclusion of this project. **Provide each code's name, acronym, and function.**

Briefly describe the **commitment** of the project participants to maintain the software beyond the duration of this project. Proposals that do not have a DoD sponsor committed to future maintenance of the software to be developed will be disqualified.

Identify **at least three** DoD HPCMP scalable **architectures** that will be used to develop scalable implementations of the proposed software. In addition, identify the DoD scalable high performance computing platforms to be used for demonstration and production computations.

Proposal Text Mandatory Headers	Content Description

Funding Requirements Table

The evaluators will appraise this section to determine the answers to these questions:

- Does the proposal leverage non-CHSSI sources of funding or other ongoing activities?
- Is the funding level appropriate to the team composition, schedule and work to be accomplished in creating the deliverables?
- Have sufficient resources been outlined to meet the documentation, reporting, and testing requirements?
- Are these funding levels or activities identified by Service/Agency?
- What is the level of Service/Agency or multi-Service/Agency commitment to support completed projects?

The **financial resources** needed to execute the proposed project are presented in this section, as is the planned distribution of funds between/among project participants. See the sample table on the page following.

CHSSI Funding Category	FY 2004	FY 2005	FY 2006	Total
Participant A Code Development				
Participant B Code Development				
Total Code Development	=sum(b2:b3)	=sum(c2:c3)	=sum(d2:d3)	=sum(e2:e3)
Total Project Management				
Total CHSSI Funding	=sum(b4:b5)	=sum(c4:c5)	=sum(d4:d5)	=sum(e4:e5)

Proposers should note that there are considerable **software testing, documentation writing, and status reporting** requirements imposed on CHSSI. (See paragraph 6.) CHSSI project management requirements include software development plans, revision control, alpha- and beta-testing, monthly financial reporting, quarterly progress reporting, and annual reviews. Travel may also be required to brief CHSSI management or portfolio leaders or to meet with team members. Proposals should budget for these requirements and they should be shown as a separate line (under *Total Project Management*) on this table.

Proposal Text Mandatory Headers	Content Description

Also identify the **matching** funding from other government agencies, academia, or industry that will be leveraged. See the sample table below.

Other Leverage	FY 2004	FY 2005	FY 2006	Total
Total "Matching" Funds				

Project Team

Describe the makeup of the integrated project team and identify contributions of each participant. Specify the **fraction** of project effort for each participant and the participant's **role** in the project. Please note that we encourage inter-service teaming.

Describe the members' **experience** working similar **joint** projects and/or plans to develop and maintain **communication and cooperation**.

Ensure the following questions are satisfactorily answered in your narrative:

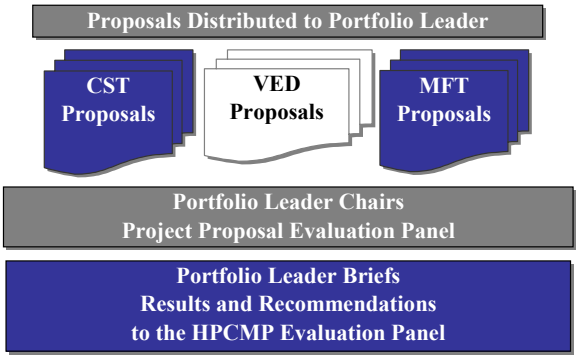
- Do the team members have credentials that would engender success for the project?
- Do the team members have a history of successful development efforts?
- What has been the team members' past performance with CHSSI projects, if applicable?
- What experience have they had working with one another or what methods will be used to maintain cooperative/collegial working relationships?

c. Resume Attachment: The resumes are not counted toward the maximum 20 page limit which applies to the text portion of the proposal.

Mandatory Attachment	Content Description
Resumes	As an attachment (of not more than five pages) to the proposal, provide short resumes of the **key participants** in the development effort. List full name, organization, position, **role in the development effort**, telephone number, and email address, and include brief descriptions of germane qualifications (highlighting experience in high performance computing and/or computational science). **No one resume should exceed one page.** The aggregate number of pages for all resumes may not exceed five pages. Evaluators will use this information to key in on the following questions: - Do team members have **credentials** that would engender success for the project? - Do team members have a history of **successful development** efforts? - What has been the team members' **past performance with CHSSI projects**, if applicable?

4. Evaluation: Proposals will be received and catalogued by the CHSSI team at the High Performance Computing Modernization Program Office (HPCMPO) who will send the proposals to the appropriate portfolio leader. The portfolio leader will chair a project proposal evaluation panel which will evaluate the proposals using the criteria shown below. Panel members may not be members of the proposal teams. The panels will evaluate proposals using a 100-point total scoring scheme against the criteria shown below. Each portfolio leader (panel chair) will use the panel's evaluation results to craft the portfolio's composition options and submit the portfolio plan to the Project Manager for Software Applications Support. Each portfolio leader will provide a 30-minute presentation to the HPCMP evaluation panel (chaired and assembled by the Project Manager for Software Applications Support) describing the consolidated portfolio and key benefits of each included

Project Proposal Evaluation Phase



project associated with each portfolio option. The portfolio leader will also provide details concerning the proposals not recommended for selection. The High Performance Computing Advisory Panel (HPCAP) will be invited to attend the briefings.

Maximum Points	Criteria
Not Applicable	**Fit of the Proposed Project within the Portfolio Topic** - Does the project fit the structure of the portfolio? - Does the project address a specific need of the portfolio focus area and appropriate topic area(s) within the portfolio? *"Fit of the Proposed Project" is a **Go/No Go** criterion.* *The proposed project must be responsive to the call for proposals.*
70	**Technical Merit of the Proposed Project** - Will the proposal result in significant technical advancement? - What is the value of the software proposal to the applicable portfolio? - Are the technical approach and level of innovation appropriate? - Will the resulting code be useful to a wide technical community?
15	**Financial Planning, Resourcing, and Project Management** - Does the proposal leverage non-CHSSI sources of funding or other ongoing activities? Are these funding levels or activities identified by Service/Agency? - What is the level of Service/Agency or multi-Service/Agency commitment to support completed projects? - Is the funding level appropriate to the project complexity, team composition, and schedule? - Have sufficient resources been outlined to meet the documentation, reporting, and testing requirements?
15	**Project Team** - Do the team members have credentials that would engender success for the project? - Do the team members have a history of successful development efforts? - What has been the team members' past performance with CHSSI projects, if applicable? - What experience have they had working with one another or what methods will be used to maintain cooperative/collegial working relationships?

5. Selection

The Project Manager for Software Applications Support will present the resultant ratings and recommendations to the Director, HPCMP. The Director will forward his recommendations, consistent with available funding, to the Deputy Under Secretary of Defense (Science and Technology). After a decision by the Deputy Under Secretary of Defense (Science and Technology), an announcement of FY 2004 CHSSI project awards will be made to the DoD user community. **We have tentatively scheduled the announcement for September 20, 2003.**

6. <u>Post-Selection Requirements:</u> There are significant requirements for documentation, testing, reporting, and financial management that the portfolio leader and each selected project's principal investigator/ project leader must complete during the course of the project's development and fielding. Key requirements are outlined below. **Compliance with CHSSI project management, reporting, and documentation requirements is essential for continued funding of selected projects.**

Category	Item
Management Endorsement	A **memorandum of endorsement** from your laboratory or test center director will be the **first post-selection requirement - due within 30 days of selection**. The purpose of the memorandum is to convey the director's knowledge of and **support** for the endeavor, noting that the work may divert some of the time the project leader would normally work in direct support of the organization's mission. This memorandum also acknowledges the **responsibility** of the project leader's organization for support of the software product(s) after CHSSI development effort is completed. A sample memorandum is at the last page of these instructions. **Do not submit a proposal if you do not expect to receive the endorsement from your management.** Projects failing to obtain and submit the required management endorsement will not be funded and will be removed from selection.
Documentation	**Formal Export Control Certification and Statement of Intellectual Property Rights** Within three (3) months after selection, project leaders will submit a formal document which provides an official statement concerning the project's export control determination, software protection status, and issues of intellectual property rights.

Category	Item
	Software Development Plan Project leaders will develop their project's software development plan and subsequently refer to it, follow it, review, recommend changes, and report on compliance with the plan. The document is a detailed plan for developing the software and includes schedules, project plans, commitments, and resources. It describes the process for designing, implementing, documenting, and testing the final software product, and addresses these specific questions: - What is to be produced for delivery? - What tasks must be accomplished and when must these tasks be started and completed? - What is the order in which these tasks must be accomplished and what are the task dependencies? - What are the criteria for acceptance of the final product? - Who will perform the tasks that are required to produce the deliverables and how, specifically, will these tasks be performed?
	Test and Evaluation Master Plan (TEMP) addendum Project leaders help to write and to provide annual updates of the project's portion of an addendum to the HPCMP's TEMP for the portfolio. Approval of the addendum by the Project Manager for Software Applications Support is required before subsequent funds are released for the project's continuation. The addendum covers these areas: - System description - Measures of effectiveness and suitability (critical technical parameters, management indicators, and requirements traceability) - Integrated test program schedule (key milestones, deliverables, and testing at the systems acceptance, Alpha release, Beta release, and initial operational release levels) **(A minimum of two milestone events each year must be identified in the schedule. Progress in achieving these milestones will be the primary factor in authorizing continued funding for the project.)** - Detailed descriptions of the developmental test and evaluation process and criteria - Interoperability requirements - Software maturity exit criteria, and - Resource summary and critical operational issues.

<table>
<tr><th>Category</th><th>Item</th></tr>
<tr><td>Testing</td><td>
<table>
<tr><th>Test Phase</th><th>Purpose</th><th>Users</th><th>Test Reviewers</th><th>Decision to Continue Project</th></tr>
<tr><td>Software Acceptance Test</td><td>Establish baseline.</td><td>Development team</td><td>CTA/Portfolio Leader</td><td>CTA/Portfolio Leader</td></tr>
<tr><td>Alpha</td><td>Assess progress and set course correction.</td><td>Development team and "friendly" parties</td><td>Internal to CTA/Portfolio Leader's organization</td><td>HPCMP</td></tr>
<tr><td>Beta</td><td>Assess progress and OTRR/OT&E feasibility.</td><td>Subset of targeted community (honest brokers)</td><td>External review</td><td>HPCMP</td></tr>
<tr><td>Operational Test Readiness Review</td><td>Certify readiness for operational testing.</td><td>Targeted user community</td><td>External reviewers</td><td>HPCMP and JITC</td></tr>
<tr><td>Initial Operational Test and Evaluation</td><td>Assess operational suitability.</td><td>Targeted user community</td><td>External reviewers</td><td>Sponsoring Service or Agency</td></tr>
</table>
Portfolio and project leads are required to write test plans for three developmental test phases, provide test documentation, and to successfully conduct and submit reports concerning the results of those tests. The Project Manager for Software Applications Support may require the project to undergo an Operational Test Readiness Review. The Joint Interoperability Test Command (JITC), an independent test agent, may conduct Initial and/or Follow-on Operational Test and Evaluation of the projects. These test phases are outlined in the chart above.
</td></tr>
<tr><td>Monthly Financial Reports</td><td>Portfolio leaders furnish monthly financial reports to the HPCMPO. Project leaders must submit information to the portfolio leaders regarding obligations and expenditures for the current and previous fiscal years. More detailed financial reports are to be provided upon request from the HPCMPO.</td></tr>
<tr><td>Quarterly Progress Reports</td><td>Project leaders provide feeder information to portfolio leaders for quarterly status reports to the HPCMPO. These reports follow a required format and the project leader therein details development progress, difficulties or delays encountered or anticipated, and resultant proposed changes in cost or schedule.</td></tr>
</table>

Category	Item
Other Data Calls	Portfolio and project leads must also respond in an accurate and timely manner to *ad hoc* data calls and reports requested by or on behalf of the Project Manager for Software Applications Support.

7. Additional Information: Please refer to the HPCMPO World Wide Web page at http://www.hpcmo.hpc.mil/ for additional information about CHSSI. There is a proposal template in Microsoft Word that you may download from that site. The template corresponds to the format for this call for proposals. Frequently asked questions about this call for proposals will also be posted to that web site.

SAMPLE MEMORANDUM OF ENDORSEMENT

Use the appropriate Service/Agency letterhead and memorandum format.

TO: Project Manager for Software Applications Support
DoD High Performance Computing Modernization Program Office
1010 North Glebe Road, Suite 510
Arlington, VA 22201-4795

SUBJECT: Memorandum of Endorsement

The <Name of Parent Organization> fully supports the development efforts of the proposed Common High Performance Computing Software Support Initiative (CHSSI) project <Title of Project>, headed by <Principal Investigator's (PI's) Name>. It is understood that <PI's Name> will devote a portion of his/her normal duty time in support of this effort.

<Organization Name> currently funds this software development project as part of <PI's Name> <Internal Project Name> at $/year. This effort is funded through FY 20##.

Upon the completion of CHSSI funding for this project, <Organization Name> will maintain and provide support for the developed software products for the DoD.

Signature and signature block of
Division Chief, Laboratory Director, or
Test Center Director